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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/725,769	12/02/2003	Stuart M. Lindsay	MOL 0077 PA/40518.112	3836

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EXAMINER

LIVEDALEN, BRIAN J

ART UNIT PAPER NUMBER

2878

DATE MAILED: 12/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/725,769	Applicant(s) LINDSAY ET AL.	
	Examiner Brian J. Livedalen	Art Unit 2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12/6/2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This action is in response to amendment filed 12/6/2005.

Claims 1-13 and 15 are still pending.

Claim Rejections - 35 USC § 102

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Sarkar (6806991).

In regard to claims 1 and 12, Sarkar discloses (fig. 2) a fast scanning stage for a scanning probe microscope, the scanning probe microscope including a probe (fig. 9, 901, column 7, lines 1-10), the stage comprising, at least one fixed support (fig. 8b. 600, column 6, lines 33-44), and a sample stage (202) having at least one axis of translation, the sample stage being affixed to the at least one fixed support by means for causing displacement (203 and 201) of the stage relative to the probe (column 4, lines 10-49).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 2-6 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sarkar (6806991), as applied to claim 1, and in view of Flecha et al. (5773824).

In regard to claims 2, 3, 5, and 6, Sarkar discloses (fig. 2) a fast scanning probe microscope as set forth above in claim 1. Sarkar further discloses that the means for causing displacement of the stage has four actuator elements supporting the stage (203a-d and 201a-d) at each corner of the stage, which has a rectangular configuration; and the actuator elements form a parallelogram scanning element. Sarkar remains silent regarding using a sine waveform generator for actuating the at least one actuator element. However, Flecha discloses (fig. 1) a scanning probe microscope with a stage (12) that is driven using a sine waveform generator (column 5, lines 25-35). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a sine waveform generator to drive the stage in order to more accurately detect the sample on the stage by varying the height with respect to the probe.

Claim 4 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sarkar (6806991), as applied to claim 1, and in view of Flecha et al. (5773824) and Okiguchi (JP09054097).

In regard to claims 4 and 13, Sarkar discloses (fig. 2) a fast scanning stage for a scanning probe microscope and its method, the scanning probe microscope including a probe (fig. 9, 901, column 7, lines 1-10), the stage comprising, at least one fixed support (fig. 8b. 600, column 6, lines 33-44), and a sample stage (202) having at least one axis

of translation, the sample stage being affixed to the at least one fixed support by at least one actuator element (203 and 201, column 4, lines 10-49). Sarkar remains silent regarding using a sine waveform generator for actuating the at least one actuator element. However, Flecha discloses (fig. 1) a scanning probe microscope with a stage (12) that is driven using a sine waveform generator (column 5, lines 25-35). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a sine waveform generator to drive the stage in order to more accurately detect the sample on the stage by varying the height with respect to the probe. Sarkar in view of Flecha fail to disclose that stage is displaced by the at least one actuator element being driven at the frequency of resonant vibration corresponding to translation of the sample with respect to the probe. However, Okiguchi discloses (fig. 1) a scanning probe microscope with a stage (1) that is driven at resonant frequency with respect to the probe (2) (abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to drive the stage at its resonant frequency in order to more accurately detect the sample on the stage and obtain the maximum resolution.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sarkar (6806991), as applied to claim 1, and in view of Flecha et al. (5773824) as applied to claim 6, in view of Pai et al. (6338249).

In regard to claim 7, Sarkar in view of Flecha discloses (fig. 2) multiple actuators that translate the stage in two directions. Sarkar in view of Flecha remain silent

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regarding the actuators being electrically in parallel. However, Pai discloses a system using multiple actuators (20) that are electrically in parallel to move a single element (110) (column 3, lines 5-10). It would have been obvious to one of ordinary skill in the art at the time the invention was made to put the actuators electrically in parallel in order to control the actuators independent from each other.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sarkar (6806991) in view of Flecha et al. (5773824) as applied to claim 2, in view of Erlings (US RE37560).

Regarding claim 8, Sarkar in view of Flecha discloses a translational stage displaced by piezoelectric stack actuators (column 2, lines 39-54). Sarkar in view of Flecha remains silent regarding the actuator being a stack-bending element. However, Erlings teaches that piezoelectric stacks are commonly used in displacing a stage for a scanning microscope (column 1, lines 17-30). It would have been obvious to one of regular skill in the art at the time the invention was made to include the stack actuators of Erlings to the translational stage of Sarkar in view of Flecha actuate larger displacements.

Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sarkar (6806991), as applied to claim 1, and in view of Flecha et al. (5773824) in view of Zdeblick (US 4906840).

Regarding claims 9 and 10, Sarkar in view of Flecha discloses a stage moveable by at least one piezoelectric stack actuator (column 2, lines 39-54). Sarkar in view of

Flecha is silent regarding a pzt bimorph actuator. However, Zdeblick discloses a pzt bimorph actuator (cantilever, fig 9) that actuates the tip of a probe (column 2, lines 43-48). It would have been obvious to one of regular skill in the art at the time the invention was made to include the pzt bimorph actuator of Zbedlick to the stage of Sarkar in view of Flecha to apply the precise movement of Zbedick's probe to the motion of the stage.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sarkar (6806991), as applied to claim 1, and in view of Marchman (US 5811796).

Regarding claim 11, Sarkar discloses (fig. 2) a scanning probe microscope with a moveable stage. Sarkar remains silent regarding the material of the stage. However, Marchman discloses a scanning microscope including a probe (column 5, line 22), and a stage (27) having at least one axis of translation and means for causing displacement of the stage relative to the probe (column 5, lines 57-column 6 line 24). Marchman further discloses the stage (disc, 27)) being made out of a ceramic material (fig 2A, column 6, lines 32-37).

Claim 15 rejected under 35 U.S.C. 103(a) as being unpatentable over Sarkar (6806991) in view of Flecha et al. (5773824) and Okiguchi (JP09054097) as applied to claim 13, and in view of the publication of Ando et al (A High-Speed Atomic Force Microscope for studying biological macromolecules).

Regarding claim 15, Sarkar in view of Flecha and Okiguchi discloses a stage that is displaced at a resonant frequency. Sarkar in view of Flecha and Okiguchi is silent

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regarding the stage having a resonant frequency at $1/100^{\text{th}}$ of the probe's frequency. Ando teaches the actuator of a scanner having a resonant frequency at 8.5 kHz, 34 kHz, and 100 kHz (paragraph entitled: Imaging Bandwidth). Ando further discloses the probe having a resonant frequency of 2.5 MHz (paragraph entitled: Discussion). This range provided for the ratio of frequencies is provides about $1/100^{\text{th}}$. It would have been obvious to one of regular skill in the art at the time the invention was made to actuate the stage and probe of Yasuda in a relationship taught by Ando to increase the imaging bandwidth.

Response to Arguments

Applicant's arguments with respect to claims 1-13 and 15 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian J. Livedalen whose telephone number is (571) 272-2715. The examiner can normally be reached on 8:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on (571) 272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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THANH X. LUU
PATENT EXAMINER